SITE ASSESSMENT REPORT
FOR
NEW JERSEY ZINC
DEPUE, BUREAU COUNTY, ILLINOIS
TDD: T05-9302-013
PAN:EIL0072SAA

JULY 29, 1993

Prepared by: Raghavender Rao Nagam Date: 7/29/93

Reviewed by: John Stewart Date: 7-30-93

Approved by: Date: 7/30/93

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APPENDICES

1. INTRODUCTION:

The Ecology and Environment, Inc. (E & E) Technical Assistance Team (TAT) was tasked by the Emergency and Enforcement Response Branch (EERB) of the United States Environmental Protection Agency (U.S. EPA) on February 26, 1993, under Technical Direction Document T05-9302-013 to assess site conditions at the New Jersey Zinc site, evaluate threats to human health and environment and prepare a cost projection for a removal action if the situation warranted.

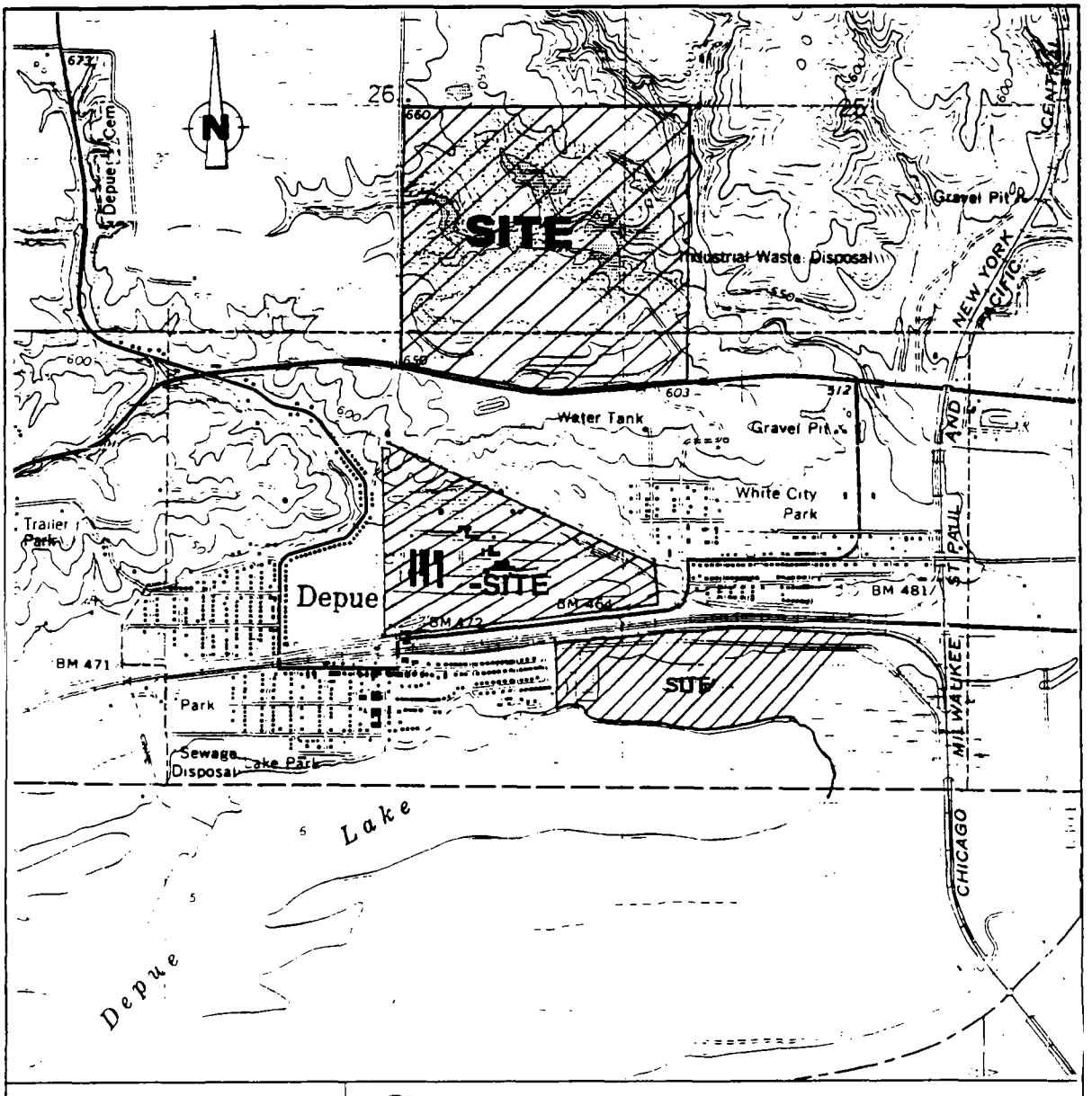
The New Jersey Zinc (NJZ) site is an inactive zinc smelting facility, located in DePue, Illinois (Figure 1 - site location map). The NJZ site has been previously investigated by Illinois Environmental Protection Agency (IEPA) and the Remedial Branch of the U.S. EPA.

2. **SITE BACKGROUND:**

The NJZ site is an inactive zinc smelting facility encompassing an area of about 810 acres. New Jersey Zinc Corporation operated the facility for zinc smelting operations. New Jersey Zinc Corporation, which is now called Zinc Corporation of America, currently owns approximately 60 acres of the site area while Mobil Mining and Minerals Company (Mobil) owns approximately 750 acres of the site area including the rights to Lake DePue. Information gathered from the Remedial Branch of U.S. EPA indicates that slag and other contaminated material from NJZ smelting operations were taken off-site for use as road, and other fill and bedding uses (Reference #1). The actual size of the site is unknown, but may extend well beyond the property boundaries. IEPA estimates that the existing residential soil contamination is over 200 acres (Reference #2). The actual period of smelting operations are unknown at this time.

In October of 1981, IEPA entered into a Consent Decree with NJZ Company to cover the zinc wastepile, install a sewer system, to collect surface water runoff from the area near the pile and on the pile, and establish a sampling and monitoring program. An Extended Site Inspection (ESI) report by IEPA indicates that the top of the zinc pile is now well vegetated, but the highly eroded slopes are completely exposed. Drainage from the area is brilliant aqua green to a cloudy light green color, extending from the pile all the way down to Lake DePue via a man-made discharge channel. This discharge is covered by a National Pollution Discharge Elimination System (NPDES) permit.

During the month of February 1993, the Remedial Branch of the U.S. EPA investigated the site. Analytical results of the samples taken during this investigation indicated significantly elevated concentrations of arsenic, cadmium, cobalt, copper, cyanide, iron, lead, manganese, selenium,



Quadrangle Location

ecology and environment, inc.
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Region V
111 W. Jackson Blvd., Chicago, Illinois 60604

TITLE: Site Location Map		FIGURE #: 1
SITE: New Jersey Zinc		SCALE: 1:24,000
CITY: DePue	STATE: IL	PAN: EIL0072SAA
SOURCE: U.S.G.S. DePue Topographic Quadrangle		DATE: 1966 REVISED: 1979

silver, sodium and zinc.

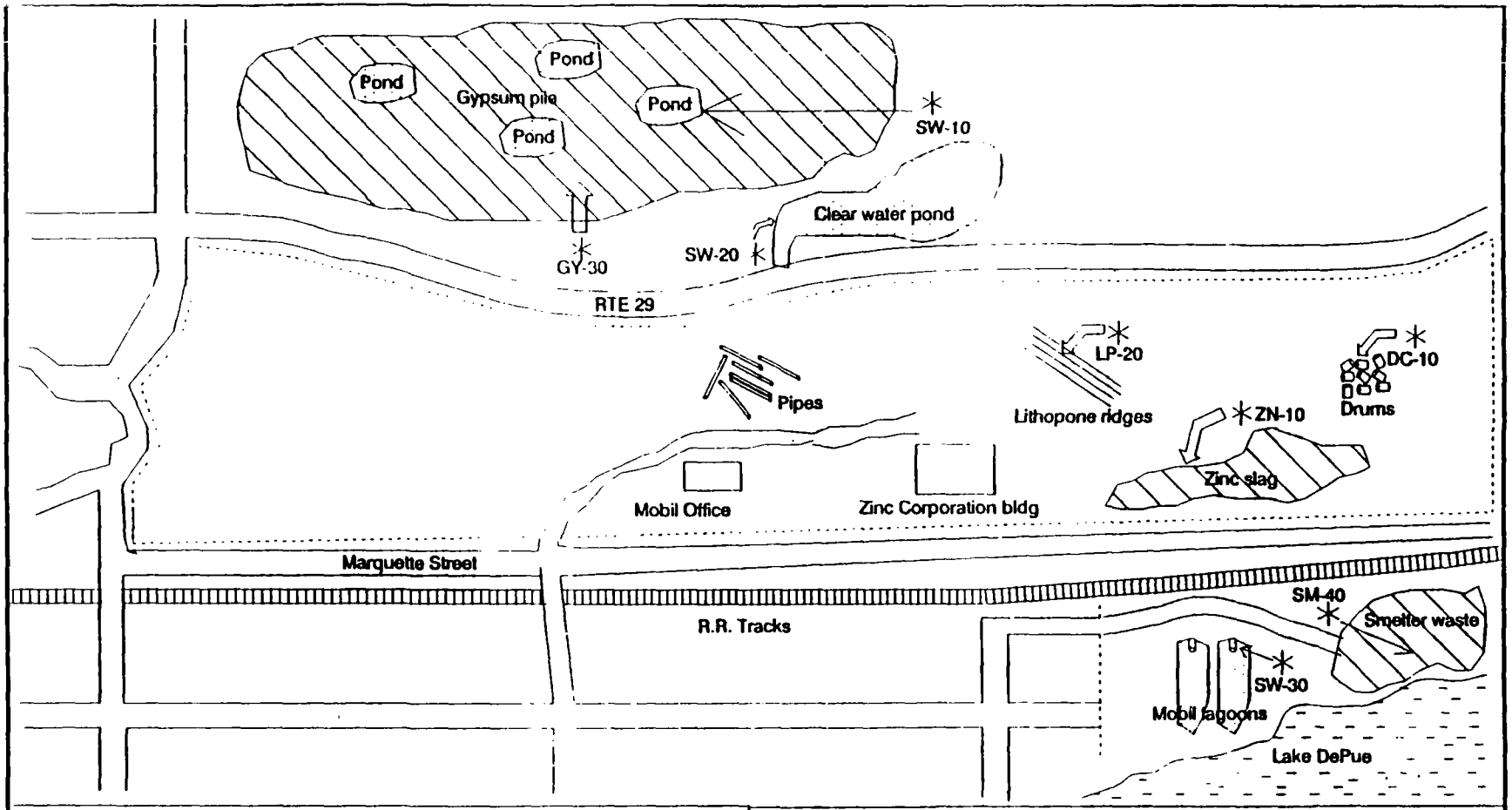
2. SITE ACTIVITIES:

The TAT members R. Nagam, D. Tiebout and J. Sherrard mobilized equipment and arrived at the site on March 11, 1993. TAT met with U.S. EPA On-Scene Coordinator (OSC) Stavros Emmanouil and IEPA members Bruce Ford and Richard Lange on the site. After gathering background information provided by Bruce Ford and Richard Lang, TAT, U.S. EPA, and the IEPA members met with the representatives of Mobil and Zinc Corporation of America. OSC Emmanouil briefed them of the intended site activities and requested the representative of Mobil to brief site features during the site reconnaissance. Both the Mobil Corporation, and the Zinc Corporation of America, hired consultants to split the samples that will be collected by TAT during this site assessment (SA). During this site reconnaissance, Ms. Eileen Helmer of the Remedial Branch of U.S. EPA joined the SA group.

The purpose of this SA is to collect samples from the site area, to document the presence of any hazardous contaminants, and evaluate threats to human health and environment due to these contaminants.

Due to prevailing cold and cloudy conditions, site monitoring was limited to radiation monitoring with the radiation meter. The following is a brief summary of the site reconnaissance: The New Jersey Zinc site, which covers about 810 acres is traversed by Route 29 and Marquette Street (Figure 2 - site features map). The area north of Route 29 consists of a huge gypsum pile, several gypsum ponds on top of the pile and a clearwater pond at the base of the gypsum pile. This area was fenced and the entrance controlled by a gate. The area lying between Route 29 and Marquette Street consists of the Mobil and Zinc Corporation of America office buildings, a huge zinc smelter waste pile, several lithophone ridges, deteriorated drums, and some pipes. This part of the site area was mostly fenced, and access controlled by a gate. The site area south of Marquette Street consisted of two Mobil lagoons and a buried miscellaneous smelter waste pile. Immediately bordering the site on its southern boundary was Lake DePue. The entrance to this site area was controlled by a gate.

Mr. Robert Barnes of Mobil Corporation indicated that Mobil's manufacturing plant was dismantled in late 1992, and that the steel pipes mentioned earlier were part of that building. Mr. Bruce Ford indicated that Mobil couldn't scrap these pipes because of apparent radioactivity. The nuclear division of IEPA had since monitored these pipes and concluded that the radiation levels were below the hazard levels. To the



LEGEND

* Approximate composite sample location

Fence

NORTH

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TITLE	Sample Location Map	FIGURE #	2
SITE	New Jersey Zinc	TDD#	T05-9302-013
CITY	De Pue	STATE IL	SCALE Not to scale
			DATE 4/2/93

southeast of the Mobil office is the NJZ building. To the north of the NJZ building, several lithophone ridges were observed. Information available indicates that these ridges contain waste from the manufacture of zinc based paints. TAT observed four of these lithophone ridges stretching to about 450 yards in length and extending to about 4 yards in height. To the southeast of these ridges, several drums containing gravel and sand were observed. These metal drums were all deteriorated and partially buried in the soil. Robert Barnes indicated that the used filter from Mobil plant operations was drummed and kept here. To the south of these drums, and extending parallel to Marquett Street is the zinc slag pile covering about 15 acres of area. The top of this zinc pile appeared grassy while the slopes appeared eroded.

After the reconnaissance of this area, the SA team drove to the site area north of Route 29. TAT observed a 40 to 50 feet tall gypsum waste pile covering about 150 acres. Several gypsum ponds were located on top of this pile. These ponds, which contain the process water form the zinc plant, were used for evaporating the water. At the bottom of the gypsum wastepile, the clearwater pond was observed. Available information indicated that the clearwater pond was used as a make-up water source for the plant operations.

After the reconnaissance of this area, the SA team proceeded to the site area south of Marquette Street. This area had a gate and a fence. A rail road track ran parallel to Marquette Street. Two lagoons were observed in this area adjacent to Lake DePue. A discharge canal was observed connecting the lagoon and Lake DePue. R. Barnes indicated that the lagoons were used by Mobil for settling the solids from the non-contact cooling water before discharging to Lake DePue, and that this discharge was covered by an NPDES permit. To the east of these lagoons and extending parallel to Lake DePue, is a patch of land, that the file information had indicated was used for burying smelter waste pile. This concluded the site reconnaissance. During the entire site reconnaissance, no readings were observed above the background on the radiation meter.

After discussing with TAT members, OSC had requested that samples be collected according to the Quality Assurance Sampling Plan for Environmental Response (QASPER) prepared for this site. Samples were scheduled to be collected from all the known waste piles and ridges, water ponds and the drums.

TAT collected the first surface water sample from the Mobil lagoon in the inlet area from the plant. This sample was labelled as SW-30. The second sample was collected from the buried smelter waste pile area. This was a composite soil sample collected from six locations and labelled as SM-40.

The third sample collected was surface water sample from one of the ponds on top of the gypsum pile. This sample was labelled as SW-10. The fourth sample was collected from the gypsum pile. This was a composite from three locations and labelled as GY-30. The fifth sample was collected from the clearwater pond located at the base of the gypsum pile. This sample was labelled as SW-20. The sixth sample was collected from the third lithophone ridge. This sample was a composite from three locations and labelled LP-20. The seventh sample was collected from the drums containing the catalyst filter. This sample was a composite from several drums and labelled as DC-10. These drum materials appeared to contain sand and gravel. The eighth sample was collected from the Zinc waste pile. This was a composite soil sample collected from three locations and labelled as ZN-10. In addition to the above samples, an Matrix Spike/Matrix Spike Duplicate sample was also collected from the clearwater pond.

Fresh pair of sampling gloves and rubber booties were used for collecting each sample. Each surface water sample was collected in three one liter bottles, and one of these bottles was preserved with nitric acid as required for metal analysis. After these sampling activities, all potentially contaminated personal protective equipment (PPE) was bagged and given to Bruce Ford of IEPA per OSC's recommendation. During this SA, TAT photographed the features of the site which are included in Appendix A. After these site activities, TAT demobilized from the site.

A blank sample (3 - 1 liter bottles) was prepared from distilled water on March 12, 1993, and labelled as SW-40. One of the blank sample bottles was preserved with nitric acid. All samples were hand delivered to Quality Analytical Laboratory in Lisle, Illinois, on March 12, 1993. All samples were requested to be analyzed for total concentration of Target Analyte List (TAL) compounds, pH, reactive cyanide and reactive sulfide. A Quality Assurance/ Quality Control (QA/QC) level II criteria was requested for the analysis, with 14 calendar days verbal and 21 calendar days hard copy result reporting.

4. ANALYTICAL RESULTS:

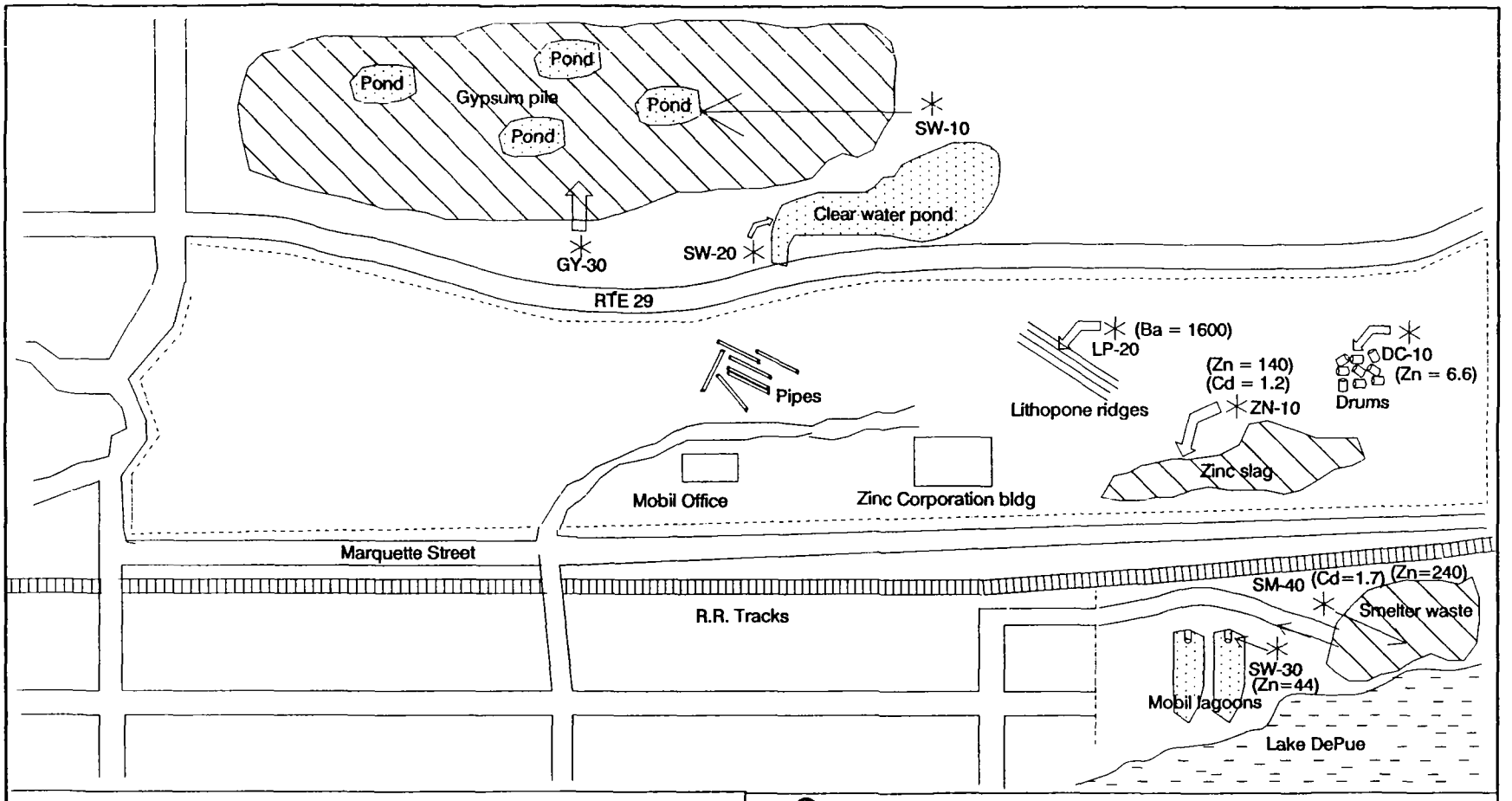
Analytical results of the samples collected are included in Appendix B. These results indicate elevated Total Chemical Leachate Procedure (TCLP) concentrations of zinc and barium. Analytical results indicate barium TCLP concentration in lithophone waste ridge sample LP-20, at 1,600 parts per million (PPM), zinc TCLP concentrations of 140 PPM in sample ZN-10, 240 PPM in sample SM-40, 44 PPM in Mobil lagoon sample SW-30, TCLP cadmium concentrations of 1.2 ppm in sample ZN-10, and 1.7 ppm in sample SM-40. Refer to Table 4.1 and Figure 3

Table 4.1

TCLP ANALYTICAL RESULTS

Sample ID Concentration Analyte/Reg. Limit	SW-30 mg/l	ZN-10 mg/l	LP-20 mg/l	GY-30 mg/l	SM-40 mg/l	DC-10 mg/l
Arsenic (5 mg/l)	NA	NA	NA	NA	ND	ND
Barium (100 mg/l)	NA	NA	1600	NA	NA	NA
Cadmium (1 mg/l)	NA	1.2	0.012	NA	1.7	NA
Chromium (5mg.l)	NA	NA	NA	NA	NA	1.7
Lead (5mg/l)	NA	0.32	ND	NA	1.0	0.04
Mercury (0.2 mg/l)	NA	0.0008	NA	NA	NA	NA
Selenium (1mg/l)	NA	NA	NA	NA	NA	NA
Silver (5mg/l)	NA	NA	NA	NA	NA	NA
Zinc (N/A)	44	140	2.5	0.78	240	6.6

NA - Not analyzed
ND - Not detected-below the instrument detection level



LEGEND

* Approximate composite sample location

NORTH

(Zn = 240) TCLP Metal Result in mg/L

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TITLE: Elevated TCLP Results	FIGURE #: 3
SITE: New Jersey Zinc	TDD#: T05-9302-013
CITY: De Pue STATE: IL	SCALE: Not to scale
	DATE: 5/12/93

for TCLP results and sampling locations. TCLP analysis was requested on those samples that had total metal concentrations above the TCLP regulatory limits. Reactive sulfide was detected at 0.29 ppm in sample ZN-10, 0.53 ppm in LP-20, 0.25 ppm in SM-40, and 0.28 ppm in DC-10. The pH on surface water sample SW-30 was 1.7 units. Any material having a pH of <2 or >12.5 is classified under 40 CFR (Code of Federal Regulations) section 261.21 as a corrosive waste.

5. DISCUSSION OF POTENTIAL THREATS:

5.1 THREAT TO HUMAN HEALTH AND ENVIRONMENT:

Conditions at the New Jersey Zinc site that warrant an appropriate removal action as set forth in paragraph (b) (2) of section 300.415 of the National Contingency Plan (NCP) are:

(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants:

Even though there are gates controlling entry into the site, there are gaps in the fence through which human population can come in contact with the potentially hazardous contaminants like barium, cadmium and zinc.

(ii) High levels of hazardous substances or pollutants or contaminants in soils, largely at or near the surface, that may migrate:

The TAT SA has revealed that several hazardous substances such as cadmium, barium, and zinc are present at elevated levels in the surface soil samples. Even though the site is not an active manufacturing facility, it still harbors two office buildings. The hazardous contaminants detected in the surface soil samples could easily by tracked off-site by people working in these offices.

(iii) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

Lake DePue borders the site on its south side. The analytical result of the sample from Mobil lagoon, SW-30, has 40 PPM of zinc contaminant and a pH of 1.7 units. Surface water run-off may result in the migration of these contaminants. As mentioned earlier, the run-off water from the zinc waste pile enters Lake DePue.

6 RECOMMENDATIONS:

The preferred action to mitigate threats associated with the presence of hazardous chemicals like zinc, cadmium and barium is to abate these threats by either removing the contaminated soil and disposing it off-site, or by treating it on-site and rendering it non-hazardous. However, since the site covers an approximate area of 810 acres, extensive sampling is needed to completely characterize the contaminants and their extent of contamination in the site soil. The samples collected during the site assessment were intended only to document the presence of hazardous contaminants. It is also recommended that immediate mitigative actions are necessary on this site to abate threats due to the lithophone ridges (Barium TCLP of 1,600 PPM). These lithophone ridges pose threats due to the potential for direct contact and off-site migration due to surface run-off water. Also, the water from Mobil lagoon with a pH of 1.7 units is a corrosive waste, and need to be addressed immediately due to its proximity to Lake DePue.

The fence surrounding different regions of the site, except for the gypsum pile region, needs to be repaired to minimize potential threat of direct contact with hazardous substances by trespassers. The mobil lagoon and smelter waste pile area need to isolated and fenced to control access of this region of the site. One of the options to abate immediate potential threats due to lithophone ridges will be to cover the ridges with an impervious layer/install a collection system to trap surface water run-off and properly dispose it. Other potentially contaminated site areas need some kind of dust control mechanisms, especially in summer, to minimize the risk to city residents from contaminated dust.

REFERENCES

1) Memo from the Remedial Branch of U.S. EPA to Emergency and Enforcement Branch of U.S. EPA

2) CERCLA Expanded Site Inspection Report, Illinois Environmental Protection Agency

APPENDIX A

PHOTO DOCUMENTATION

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 1 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1345

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: Cloudy, 25°F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of the mobil plant outlet to the lagoon. Surface water sample SW-30 collected from this outlet

DATE: 03/11/1993

TIME: 1346

DIRECTION OF PHOTOGRAPH: Southwest

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of the two mobil plant lagoons. The wooden structure is the outlet for this lagoon into Lake Depue.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 2 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1410

DIRECTION OF PHOTOGRAPH: Southeast

WEATHER CONDITIONS: Cloudy,25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: Composite surface soil sample SM-40 location on the smelter waste pile situated on the wetlands

DATE: 03/11/1993

TIME: 1412

DIRECTION OF PHOTOGRAPH: Southeast

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: Composite surface soil sample location from the smelter waste pile on wetlands

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 3 OF 8

SS ID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/93 TIME: 1419 DIRECTION OF PHOTOGRAPH: N - NE PHOTOGRAPHED BY: D. Tiebout

WEATHER CONDITIONS: Cloudy, 25°F SAMPLE ID (if applicable): NA

DESCRIPTION: View of the Zinc waste pile on the north side of the road. Also in view, is the railroad track that separates the lagoons and smelter waste pile from the rest of the site.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 4 OF 8

SS ID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/93 TIME: 1420 DIRECTION OF PHOTOGRAPH: SS - SE PHOTOGRAPHED BY: D. Tiebout

WEATHER CONDITIONS: Cloudy, 25°F SAMPLE ID (if applicable): NA

DESCRIPTION: Perspective view of the smelter waste pile (miscellaneous) that is located on the wetlands. In the background is Lake Depue.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 5 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1512

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of the Gypsum stack and one of the Gypsum ponds located on top of the gypsum stack.

DATE: 03/11/1993

TIME: 1512

DIRECTION OF PHOTOGRAPH: Southeast

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of the clear water pond. Photo taken from the top of the Gypsum stack.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 6 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1518

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: Photo showing surface water sample SW-10 collection from the Gypsum Pond

DATE: 03/11/1993

TIME: 1524

DIRECTION OF PHOTOGRAPH: Northwest

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: R. Nagam

SAMPLE ID (if applicable): N/A

DESCRIPTION: view of one of the Gypsum ponds. In the foreground are the pipes that circulate water from the Clearwater pond located at the bottom of the Gypsum stack.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 7 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1614

DIRECTION OF PHOTOGRAPH: South

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: Surface water sample SW-20 location in the Clearwater pond .

DATE: 03/11/1993

TIME: 1707

DIRECTION OF PHOTOGRAPH: North

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: Soil sample LP- 20 location on the Lithopone ridge.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: New Jersey Zinc PAGE 8 OF 8

SSID: TDD: T05-9302-013 PAN: EIL0072SAA

DATE: 03/11/1993

TIME: 1741

DIRECTION OF PHOTOGRAPH: South

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: View of sample DC-10 collection from the drums filled with filter residues.

DATE: 03/11/1993

TIME: 1753

DIRECTION OF PHOTOGRAPH: Southwest

WEATHER CONDITIONS: Cloudy, 25° F

PHOTOGRAPHED BY: D. Tiebout

SAMPLE ID (if applicable): N/A

DESCRIPTION: Soil sample ZN-10 location on the zinc pile.

APPENDIX B
ANALYTICAL RESULTS

ecology and environment, inc.
111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415
International Specialists in the Environment

MEMORANDUM

DATE: April 15, 1993

TO: Raghu Nagam, Project Manager, E & E, Chicago, IL

FROM: Jane Malkin, TAT-Chemist, E & E, Chicago, IL

THRU: Patrick Zwilling, ATATL, E & E, Chicago, IL

SUBJ: **Inorganic Data Quality Assurance Review,** New Jersey Zinc, DePue, IL

REF: Analytical TDD: T05-9303-807 Project TDD: T05-9302-013
Analytical PAN: EIL0072AAA Project PAN: EIL0072SAA

The data quality assurance review of 4 liquid samples, 1 drum sample, and 4 solid samples collected from the New Jersey Zinc site in DePue, Illinois has been completed. The analysis for total metals by inductively coupled plasma (ICP) (EPA method 6010), the analysis of mercury by manual cold-vapor (EPA method 7471), the analysis of reactive cyanide according to procedure outlined in EPA-SW 7.3.3.2, the analysis of reactive sulfide according to procedure outlined in EPA-SW 7.3.4.1, and pH by EPA method 9040 was performed by QA Analytical, Lisle, Illinois. The analysis of molybdenum, EPA method 6010, was subcontracted to NET, Inc., Bartlett, Illinois.

The samples were numbered as follows:

Liquid samples: SW-10, SW-20, SW-30, and SW-40
Drum sample: DC-10
Solid samples: ZN-10, LP-20, GY-30, and SM-40.

Sample number SW-40 was a field blank sample.

Data Qualifications:

I. Sample Holding Time:

A. Metal Samples: Acceptable

The metal samples were collected on March 11, 1993 and analyzed by March 30, 1993. The metal samples were analyzed within the 6 months holding time from the date of collection allowed for metal

samples and within the 28 days allowable for mercury samples.

B: Cyanide Samples: Qualified

The holding time for cyanide samples exceeded the allowable time of 14 days. The non-detect results for cyanide were flagged (R) as unusable. (See also Section II for cyanide).

II. Calibration

A. Initial Calibration and Calibration Verification:

1. Metal Samples: Acceptable

A blank and one standard was used for the initial calibration. The percentage recoveries for the calibration verification test were within 90 - 110% of the true standard values. No contamination above the instrument detection limit (IDL) was detected in the initial calibration blank.

Four standards and 2 blanks were utilized for mercury calibration. The correlation factor was within the acceptable limit of $\leq .995$.

2. Cyanide Sample: Qualified

The cyanide analysis was run on March 26, 1993. The percentage recovery for the initial calibration verification test was outside the acceptable limits. On March 30, 1993, a recalibration was conducted and the samples were rerun, at which time the calibration verifications were within the acceptable limits. Since the holding time had far exceeded the allowable holding time, the results were flagged (R) as unusable.

3. Sulfide Samples: Acceptable

The percent recovery for the calibration verification test was within the acceptable limits.

B. Continuing Calibration:

1. Metals: Acceptable

The percent recoveries for continuing calibration verification tests were within the control limit of 90 - 110%. The percent recovery for mercury was within the control limits of 80 - 120%. No contamination above the IDL was detected in the continuing calibration blank.

2. Cyanide: Qualified

The percent recovery was outside the prescribed control limits of 85 - 115%. Since the results were flagged previously, no

action was taken.

3. Sulfide: Acceptable

The percent recovery was within the control limits.

III. Blanks:

A. Metal Samples: Qualified

A method blank was prepared and analyzed with the samples. Readings above the instrument detection limits (IDL) were recorded for chromium, copper, zinc, aluminum, barium, calcium, iron, magnesium, manganese, potassium, sodium, vanadium, boron, and silicon. All associated positive results lesser than 5 times the concentration detected in the method blank were flagged (U) as undetected.

Results of the analysis Sample SW-40 which was a field blank also showed results above the IDL.

IV. Laboratory Control Sample Analysis:

A. Metal Samples: Acceptable

All percentage recoveries were within the control limits of 80 - 120%.

V. Matrix Spike/Matrix Spike duplicate (MS/MSD): Acceptable.

All percent recoveries for the MS/MSD analysis were within the control limits and the percent difference between the recoveries were all within the control limits.

VI. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in "Quality Assurance/Quality Control Guidance for Removal Activities" (OSWER Directive 9360.4-01, April 1990). Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifier Definitions:

R - The data are unusable (Note: analyte may or may not be present).

U - The material was detected in the blank. Concentration lesser than 5X the concentration in the blank were flagged (U), as undetected.

Sample ID: 930338-1 SW-10 Gypsum Pond

TAL List METALS	Method: SW846 6010,7470	
Parameter	PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	0.18
Beryllium	0.005	ND
Cadmium	0.005	0.038
Chromium	0.01	0.06
Copper	0.02	0.04 (m)
Lead	0.04	ND
Mercury	0.0002	0.0005
Nickel	0.02	0.11
Selenium	0.12	ND
Silver	0.01	0.12
Thallium	0.12	ND
Zinc	0.01	2.1 (m)
Aluminum	0.04	1.4 (m)
Barium	0.005	0.23 (m)
Calcium	0.050	320.
Cobalt	0.02	0.03
Iron	0.02	1.5 (m)
Magnesium	0.03	28.0
Manganese	0.01	2.7
Potassium	0.10	98.
Sodium	0.03	450.
Vanadium	0.01	0.06 (m)
Boron	0.05	0.56 (m)
Molybdenum	0.10	ND
Silicon	0.10	52.

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/L)	Analysis (mg/L)
pH		5.9
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	ND

4/15/93

Sample ID: 930338-2 SW-20 Clear Water Pond

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	ND
Beryllium	0.005	0.006
Cadmium	0.005	ND
Chromium	0.01	0.02 (w)
Copper	0.02	0.07 (w)
Lead	0.04	0.09
Mercury	0.0002	0.0008
Nickel	0.02	0.08
Selenium	0.12	ND
Silver	0.01	0.23
Thallium	0.12	ND
Zinc	0.01	8.3
Aluminum	0.04	1.1
Barium	0.005	0.18 (w)
Calcium	0.050	250.
Cobalt	0.02	0.04
Iron	0.02	2.0 (w)
Magnesium	0.03	150.
Manganese	0.01	3.0
Potassium	0.10	48.
Sodium	0.03	240.
Vanadium	0.01	0.09 (w)
Boron	0.05	0.44 (w)
Molybdenum	0.10	ND
Silicon	0.10	27.

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/L)	Analysis (mg/L)
pH		5.7
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	ND

4/15/93

Sample ID: 930338-3 SW-30 Mobile Lagoons

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	ND
Beryllium	0.005	ND
Cadmium	0.005	0.057
Chromium	0.01	ND
Copper	0.02	0.23 (M)
Lead	0.04	0.04
Mercury	0.0002	0.0007
Nickel	0.02	0.10
Selenium	0.12	ND
Silver	0.01	0.08
Thallium	0.12	ND
Zinc	0.01	40.
Aluminum	0.04	0.69
Barium	0.005	0.22 (M)
Calcium	0.050	52.
Cobalt	0.02	0.12
Iron	0.02	1.6 (M)
Magnesium	0.03	27.
Manganese	0.01	7.1
Potassium	0.10	9.6
Sodium	0.03	29.
Vanadium	0.01	0.06 (M)
Boron	0.05	0.28 (M)
Molybdenum	0.10	ND
Silicon	0.10	9.1

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/L)	Analysis (mg/L)
pH		1.8
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	ND

4/15/93

Sample ID: 930388-4 SW-40 HPS

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	ND
Beryllium	0.005	ND
Cadmium	0.005	ND
Chromium	0.01	0.04 (u)
Copper	0.02	0.10 (u)
Lead	0.04	0.10
Mercury	0.0002	0.0006
Nickel	0.02	ND
Selenium	0.12	ND
Silver	0.01	0.10
Thallium	0.12	ND
Zinc	0.01	1.7 (u)
Aluminum	0.04	0.45
Barium	0.005	0.14 (u)
Calcium	0.050	8.2 (u)
Cobalt	0.02	ND
Iron	0.02	2.3 (u)
Magnesium	0.03	1.2 (u)
Manganese	0.01	0.07 (u)
Potassium	0.10	0.60 (u)
Sodium	0.03	2.0 (u)
Vanadium	0.01	0.08 (u)
Boron	0.05	0.18 (u)
Molybdenum	0.10	ND
Silicon	0.10	1.2 (u)

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/L)	Analysis (mg/L)
pH		1.7
Reactive Cyanide	0.5	ND (k)
Reactive Sulfide	0.5	ND

4/15/93

Sample ID: 930388-5 ZN-10 Zinc Smelting Pile

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Antimony	0.20	57.
Arsenic	0.75	93.
Beryllium	0.025	0.060
Cadmium	0.025	71.
Chromium	0.05	12.
Copper	0.10	1900
Lead	0.20	1900
Mercury	0.005	0.40
Nickel	0.10	12.
Selenium	0.60	ND
Silver	0.05	12.
Thallium	0.60	5.2
Zinc	0.05	15000
Aluminum	0.20	6400
Barium	0.025	160
Calcium	0.25	17000
Cobalt	0.10	18.
Iron	0.10	45000
Magnesium	0.15	8200
Manganese	0.05	870
Potassium	0.50	920
Sodium	0.15	140
Vanadium	0.05	17.
Boron	0.25	12.
Molybdenum	0.50	ND
Silicon	0.50	ND

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
pH (10% solution)		6.6
Reactive Cyanide	0.5	ND (K)
Reactive Sulfide	0.5	0.29

4/15/93

Sample ID: 930388-6 LP-20 Lithopone Waste Ridge

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Antimony	0.20	18.
Arsenic	0.75	6.2
Beryllium	0.025	0.16
Cadmium	0.025	8.8
Chromium	0.05	9.5
Copper	0.10	50.
Lead	0.20	250
Mercury	0.005	0.01
Nickel	0.10	30.
Selenium	0.60	ND
Silver	0.05	ND
Thallium	0.60	1.1
Zinc	0.05	1100
Aluminum	0.20	1500
Barium	0.025	14000
Calcium	0.25	2300
Cobalt	0.10	9.6
Iron	0.10	14000
Magnesium	0.15	700
Manganese	0.05	250
Potassium	0.50	134
Sodium	0.15	48.
Vanadium	0.05	1.2
Boron	0.25	7.0
Molybdenum	0.50	ND
Silicon	0.50	ND

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
pH (10% solution)		8.6
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	0.53

4/15/97

Sample ID: 930388-9 DC-10 Drum Composite

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Antimony	0.20	ND
Arsenic	0.75	140
Beryllium	0.025	24.
Cadmium	0.025	3.0
Chromium	0.05	69.
Copper	0.10	28.
Lead	0.20	230
Mercury	0.005	0.1
Nickel	0.10	3.3
Selenium	0.60	ND
Silver	0.05	ND
Thallium	0.60	59.
Zinc	0.05	270
Aluminum	0.20	720
Barium	0.025	27.
Calcium	0.25	1800
Cobalt	0.10	1.7
Iron	0.10	19000
Magnesium	0.15	570
Manganese	0.05	42.
Potassium	0.50	6200
Sodium	0.15	38.
Vanadium	0.05	9000
Boron	0.25	4.8
Molybdenum	0.50	9.1
Silicon	0.50	ND.

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
pH (10% solution)		5.9
Reactive Cyanide	0.5	ND R
Reactive Sulfide	0.5	0.28

PQL = Practical Quantitation Limit
ND = Not detected at or above the PQL

Respectfully submitted,

Paulius T. Alekna

Paulius (Paul) T. Alekna
Lab Director
Quality Analytical Labs, Inc.

4/15/93

ps:EC930388

Sample ID: 930388-7 GY-30 Gypsum Waste Pile

TAL List METALS	**Method: SW846 6010,7470**	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Antimony	0.20	3.0
Arsenic	0.75	ND
Beryllium	0.025	0.099
Cadmium	0.025	0.98
Chromium	0.05	5.3
Copper	0.10	2.8
Lead	0.20	3.5
Mercury	0.005	0.03
Nickel	0.10	1.5
Selenium	0.60	ND
Silver	0.05	ND
Thallium	0.60	5.5
Zinc	0.05	21.
Aluminum	0.20	1100
Barium	0.025	24.
Calcium	0.25	52000
Cobalt	0.10	0.47
Iron	0.10	1300
Magnesium	0.15	320
Manganese	0.05	16.
Potassium	0.50	510
Sodium	0.15	440
Vanadium	0.05	9.2
Boron	0.25	35.
Molybdenum	0.50	0.65
Silicon	0.50	1000

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
pH (10% solution)		5.8
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	ND

4/15/93

Sample ID: 930388-8 SM-40 Smelter (Misc) Waste Pile

TAL List METALS	Method: SW846 6010,7470	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
Antimony	0.20	34.
Arsenic	0.75	61.
Beryllium	0.025	0.039
Cadmium	0.025	97.
Chromium	0.05	11.
Copper	0.10	740
Lead	0.20	1900
Mercury	0.005	2.8
Nickel	0.10	15.
Selenium	0.60	ND
Silver	0.05	7.2
Thallium	0.60	3.4
Zinc	0.05	21000
Aluminum	0.20	6400
Barium	0.025	36.
Calcium	0.25	12000
Cobalt	0.10	11.
Iron	0.10	30000
Magnesium	0.15	5800
Manganese	0.05	1.3
Potassium	0.50	1200
Sodium	0.15	160
Vanadium	0.05	17.
Boron	0.25	15.
Molybdenum	0.50	4.9
Silicon	0.50	ND

	Method: SW846 9040,7.3.3.2,7.3.4.2	
Parameter	PQL (mg/Kg)	Analysis (mg/Kg)
pH (10% solution)		7.0
Reactive Cyanide	0.5	ND (R)
Reactive Sulfide	0.5	0.25

4/15/93

ecology and environment, inc.
111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415
International Specialists in the Environment

MEMORANDUM

DATE: April 19, 1993

TO: Raghu Nagam, Project Manager, E & E, Chicago, IL

FROM: Jane Malkin, TAT-Chemist, E & E, Chicago, IL

THRU: Patrick Zwilling, ATATL, E & E, Chicago, IL

SUBJ: **Inorganic Data Quality Assurance Review,** New Jersey Zinc, DePue, IL

REF: Analytical TDD: T05-9303-807 Project TDD: T05-9302-013
Analytical PAN: EIL0072AAA Project PAN: EIL0072SAA

The data quality assurance review of 1 liquid sample, 1 drum sample, and 4 solid samples collected from the New Jersey Zinc site in DePue, Illinois has been completed. The analysis for TCLP total metals by inductively coupled plasma (ICP) (EPA method 6010) and the analysis of mercury by manual cold-vapor (EPA method 7471) was performed by QA Analytical, Lisle, Illinois.

The samples were numbered as follows:

Liquid samples: SW-30
Drum sample: DC-10
Solid samples: ZN-10, LP-20, GY-30, and SM-40.

Data Qualifications:

I. Sample Holding Time: Acceptable

The metal samples were collected on March 11, 1993 and analyzed by April 7, 1993. The metal samples were analyzed within the 6 months holding time from the date of collection allowed for metal samples and within the 28 days allowable for mercury samples.

II. Calibration

A. Initial Calibration and Calibration Verification: Acceptable

A blank and one standard was used for the initial calibration. The percentage recoveries for the calibration verification test were within 90 - 110% of the true standard values. No contamination above the instrument detection limit (IDL) was detected in the initial calibration blank.

Four standards and 1 blanks were utilized for mercury calibration. The correlation factor was within the acceptable limit of $\leq$ .995.

B. Continuing Calibration: Acceptable

The percent recoveries for continuing calibration verification tests were within the control limit of 90 - 110%. The percent recovery for mercury was within the control limits of 80 - 120%. No contamination above the IDL was detected in the continuing calibration blank.

III. Blanks: Acceptable

A method blank was prepared and analyzed with the samples. No contamination above the instrument detection limit was reported.

IV. Laboratory Control Sample Analysis: Data not available.

V. Matrix Spike/Matrix Spike duplicate (MS/MSD): Acceptable.

Sample GY-30 was spiked by the lab. All percent recoveries for the MS/MSD analysis were within the control limits and the percent difference between the recoveries were all within the control limits.

VI. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in "Quality Assurance/Quality Control Guidance for Removal Activities" (OSWER Directive 9360.4-01, April 1990). Based upon the information provided, the data are acceptable for use.

QUALITY
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LABS, INC.

Project #: 930507
Date : 04/08/93

Ecology and Environment, Inc.
111 W. Jackson Blvd., 12th fl.
Chicago, IL 60604

ATTN: Mary Jane Ripp

Sampling Date: 03/11/93
Analyses Date: 03/31-04/07/93

Identification: Nine samples taken by R. Nagam identified as:

PROJECT I.D. No. T05-9302-013
PROJ. No. ZT2054

Results follow:

Sample ID: 930507-No.3 SW-30 MOBILE LAGOONS

Method: SW-846 6010

	PQL (mg/L)	Analysis (mg/L)
TCLP Zinc	0.01	44.

Sample ID: 930507-No.5 ZN-10 ZINC SMELTING PILE

Method: SW-846 6010 & 7470

	PQL (mg/L)	Analysis (mg/L)
TCLP Copper	0.02	2.4
TCLP Arsenic	0.15	ND
TCLP Cadmium	0.005	1.2
TCLP Lead	0.04	0.32
TCLP Mercury	0.0002	0.0008
TCLP Zinc	0.01	140.

Sample ID: 93507-No.6 LP-20 LITHOPONE WASTE RIDGE

Method: SW-846 6010

	PQL (mg/L)	Analysis (mg/L)
TCLP Copper	0.02	0.12
TCLP Cadmium	0.005	0.012
TCLP Lead	0.04	ND
TCLP Barium	0.005	1600.
TCLP Nickel	0.02	0.05
TCLP Zinc	0.01	2.5

Sample ID: 930507-No.7 GY-30 GYPSUM WASTE PILE

Method: SW-846 6010

	PQL (mg/L)	Analysis (mg/L)
TCLP Zinc	0.01	0.78

Sample ID: 930507-No.8 SM-40 SMELTER (MISC) WASTE PILE

Method: SW-846 6010 & 7470

	PQL (mg/L)	Analysis (mg/L)
TCLP Arsenic	0.15	ND
TCLP Cadmium	0.005	1.7
TCLP Lead	0.04	1.0
TCLP Mercury	0.0002	0.0009
TCLP Copper	0.02	0.57
TCLP Nickel	0.02	0.05
TCLP Zinc	0.01	240.

Sample ID: 930507-No.9 DC-10 DRUM COMPOSITE

Method: SW-846 6010

	PQL (mg/L)	Analysis (mg/L)
TCLP Arsenic	0.15	ND
TCLP Chromium	0.01	1.7
TCLP Lead	0.04	0.04
TCLP Zinc	0.01	6.6

ND = Not Detected at or above the PQL
PQL = Practical Quantitation Limit

Respectfully submitted,

Paulius T. Alekna

Paulius (Paul) T. Alekna
Lab Director
Quality Analytical Labs, Inc.

sy:EC930507

ecology and environment, inc.

111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415

International Specialists in the Environment

DATE: 6 May 1993

TO: Raghu Nagam, Project Manager, E & E, Chicago, IL

FROM: Phil Korzenecki, TAT Chemist, E & E, Chicago, IL

SUBJ: Reanalysis of samples

Raghu:

The four liquid samples collected from the New Jersey Zinc site in DePue, Illinois were re-analyzed on 4/23/93. After direct consultation, the lab performing the work, Quality Analytical Labs of Lisle, Illinois agreed to assume responsibility for QC problems with the original analysis. Accordingly, the lab performed a re-analysis on the original samples at their own expense. With the exception of Mercury, all holding time requirements were not violated and the new data was subsequently validated by me.

Don't hesitate to contact me if I can be of further assistance.

Phil Korzenecki PK

ecology and environment, inc.
111 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604, TEL. 312-663-9415
International Specialists in the Environment

M E M O R A N D U M

DATE: April 29, 1992

TO: Raghu Nagam, Project Manager, E & E, Chicago, IL

FROM: Phil Korzenecki,TAT-Chemist, E & E, Chicago, IL

THRU: Nick Rombakis, TAT-Chemist, E & E, Chicago, IL NR

SUBJ: **Inorganic Data Quality Assurance Review**, New Jersey Zinc site, DePue, Illinois

REF: Analytical TDD: T05-9303-807 Project TDD: T05-9302-013
Analytical PAN: EIL0072AAA Project PAN: EIL0072SAA

The data quality assurance review of four liquid samples collected from the New Jersey site in DePue, Illinois has been completed. The re-analysis for **Total Metals** (including **Mercury**)was performed by Quality Analytical Labs of Lisle, Illinois in accordance with USEPA methods 6010 and 7471.

The samples were numbered: SW-10, SW-20, SW-30 and SW-40.

Data Qualifications

I Sample Holding Time: Acceptable.

The metal samples were collected on 3/11/93 and analyzed on 4/23/93 which met the six month holding time requirement for metals from sample collection to sample analysis.

II Initial and Continuing Calibration: Qualified.

Percent Recoveries (%R) for the verification samples were within the QC limits of 80-120% for Mercury and 90-110% for all Metals except Silver and Silicon whose values are flagged as estimated (J).

III Blanks: Qualified.

All results of the method blank run in the analytical batch were below the Instrument Detection Limit (IDL) except Sodium, Copper and Silver. Any associated values for these three metals less than five times the concentration detected in the method blank are flagged as undetected (U).

IV Interference Check Sample Analysis: Acceptable.

Results for the ICS analysis fell within the ±20% range of the true value.

V Matrix Spike Sample Analysis: Acceptable.

Percent Recoveries (%R) and Relative Percent Differences (RPD) were within the 80-120% control limits for all samples.

VI Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in "Quality Assurance/Quality Control Guidance For Removal Activities" (OSWER Directive 9360.4-01, April 1990). Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the contract required detection limits or quality control criteria were not met.

U - The material was analyzed for but was not detected. The associated numerical value is the sample Quantitation limit.

QUALITY
ANALYTICAL
LABS, INC.

RE-ANALYSIS
Project#: 930388-A
Date : 04/23/93

Ecology and Environment, Inc.
111 W. Jackson Blvd., 12th fl.
Chicago, IL 60604

ATTN: Mary Jane Ripp

Sampling Date: 03/11/93
Analyses Date: 04/23/93

Identification: Four samples submitted by Ecology and Environment (personnel) identified as:

PROJECT I.D.: T05-9302-013
No. ZT2054

Note: Per E & E sample nos. 1 thru 4 (Metals) were re-analyzed.

Results follow:

Sample ID: 930388-No.1 SW-10 (GYPSUM POND)

TAL List METALS Parameter	**Method: SW846 6010** PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	0.28
Beryllium	0.005	ND
Cadmium	0.005	0.031
Chromium	0.01	0.03
Copper	0.02	ND
Lead	0.04	ND
Nickel	0.02	0.11
Selenium	0.12	ND
Silver	0.01	ND (J)
Thallium	0.12	0.20
Zinc	0.01	1.4
Aluminum	0.04	1.7
Barium	0.005	ND
Calcium	0.05	310.
Cobalt	0.02	0.03
Iron	0.02	0.79
Magnesium	0.03	330.
Manganese	0.01	3.2
Potassium	0.10	64.
Sodium	0.03	550.
Vanadium	0.01	ND
Boron	0.05	0.71
Silicon	0.10	42. (J)

Sample ID: 930388-No.2 SW-20 (CLEAR WATER POND)

TAL List METALS Parameter	**Method: SW846 6010** PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	0.07
Arsenic	0.15	0.19
Beryllium	0.005	ND
Cadmium	0.005	0.017
Chromium	0.01	0.02
Copper	0.02	ND
Lead	0.04	ND
Nickel	0.02	0.11
Selenium	0.12	ND
Silver	0.01	ND(J)
Thallium	0.12	0.33
Zinc	0.01	8.9
Aluminum	0.04	1.9
Barium	0.005	0.016
Calcium	0.05	250.
Cobalt	0.02	0.06
Iron	0.02	1.1
Magnesium	0.03	170.
Manganese	0.005	3.7
Potassium	0.10	31.
Sodium	0.03	300.
Vanadium	0.01	ND
Boron	0.05	0.84
Silicon	0.10	27.(J)

Sample ID: 930388-No.3 SW-30 (MOBILE LAGOONS)

TAL List METALS Parameter	**Method: SW846 6010** PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	ND
Beryllium	0.005	ND
Cadmium	0.005	0.057
Chromium	0.01	ND
Copper	0.02	0.23(u)
Lead	0.04	0.04
Nickel	0.02	0.10
Selenium	0.12	ND
Silver	0.01	0.08(J)
Thallium	0.12	ND
Zinc	0.01	40.
Aluminum	0.04	0.69
Barium	0.005	0.22
Calcium	0.05	52.
Cobalt	0.02	0.12
Iron	0.02	1.6
Magnesium	0.03	27.
Manganese	0.01	7.1
Potassium	0.10	9.6
Sodium	0.03	29.
Vanadium	0.01	0.06
Boron	0.05	0.28
Silicon	0.10	9.1 (J)

Sample ID: 930388-No.4 SW-40 (H & S)

TAL List METALS	**Method: SW846 6010**	
Parameter	PQL (mg/L)	Analysis (mg/L)
Antimony	0.04	ND
Arsenic	0.15	ND
Beryllium	0.005	ND
Cadmium	0.005	ND
Chromium	0.01	ND
Copper	0.02	ND
Lead	0.04	ND
Nickel	0.02	ND
Selenium	0.12	ND
Silver	0.01	ND (J)
Thallium	0.12	ND
Zinc	0.01	ND
Aluminum	0.04	ND
Barium	0.005	ND
Calcium	0.05	0.39
Cobalt	0.02	ND
Iron	0.02	0.10
Magnesium	0.03	0.04
Manganese	0.005	ND
Potassium	0.10	0.01
Sodium	0.03	ND
Vanadium	0.01	1.7
Boron	0.05	0.07
Silicon	0.10	0.70 (J)

ND = Not Detected at or above the PQL
PQL = Practical Quantitation Limit

Respectfully submitted,

Paulius T. Alekna

Paulius (Paul) T. Alekna
Lab Director
Quality Analytical Labs, Inc.

sy:930388-A